International Journal of Pharmacy and Technology, 2016, vol.8, N3, pages 14999-15007

Cholinergic regulation of the developing heart contractility

Kuptsova A., Ziyatdinova N., Biktemirova R., Zevfirov T.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016,International Journal of Pharmacy and Technology. All rights reserved.The activity of the sympathetic and parasympathetic divisions of the autonomic nervous system changes with aging. The researchers suggest that the changes in the heart activity are associated with the restructuring of the sympatheticparasympathetic interactions of the receptor systems in the heart. Our paper describes periods of postnatal ontogenesis associated with the formation of the sympathetic cardiac innervation. The study was conducted in vitro with the use of Power Lab (AD Instruments,Australia) device on the strips of atrial and ventricular myocardium of rats aged 20,8,6,3 and 1 weeks. The obtained results indicate that in all age groups studied the cholinoreceptor agonist – carbachol,on the background of different concentrations of a non-selective blocker of muscarinic cholinergic receptors – atropine,inhibits the inotropy of the atrial and ventricular myocardium. At the same time,the dynamics of myocardial contractility is age dependent. The findings suggest that during postnatal ontogenesis there are changes in the dynamics of myocardial contractility after administration of carbachol on the background of different concentrations of atropine. It is possible that during the main development stages of the sympathetic cardiac innervation there are changes in regulation of cardiac inotropy. Newborn rats had the least pronounced reduction of contractile force of the atrial and ventricular myocardium,and 3- and 8-week-old rats - the most pronounced.

Keywords

Heart, Inotropy, Muscarinic cholinergic receptors, Postnatal ontogenesis